GO-EF1

(2/06/02)

U.S. DEPARTMENT OF ENERGY

GOLDEN FIELD OFFICE

ENVIRONMENTAL CHECKLIST
(To Be Completed by Potential Recipient)

PART I: General Information

DOE Project Officer: James Alkire **Date:** 11/28/2005

Project Title: Investigation of Reaction Networks and Active Sites in Bio-Ethanol Steam Reforming **ST:** NY

Organization Name: XYZ State University

Solicitation Number: DE-PS36-03GO93007 Award No: DE-FCC36-05GO15998

1. Please describe the intended use of DOE funding in your proposed project. For example, would the funding be applied to the entire project or only support a phase of the project? Describe the activity as specifically as possible, i.e. planning, feasibility study, design, data analysis, education or outreach activities, construction, capital purchase and/or equipment installation or modification. If the project involves construction, also describe the operation of the completed facility/equipment.

The intended use of DOE funds covers the full range of this project (7 tasks as listed below). DOE funds will be used to provide initial capital equipment purchases (Equipment items included in the budget are Equipment A, Equipment B, Equipment C) as well as material and supplies costs (chemicals, gases, plumbing items, software and controls) over the course of the project. DOE funds will also be used to provide partial support for personnel working on the project at various stages. The P.I. and one research associate will dedicate 30-50% of their time over the course of the project. Over the course of the project, funds will also be used to support two Ph.D. students, one post-doctoral researcher, and two undergraduate researchers. Additional funds will also be used as laboratory access/user fees.

Task 1. Development of experimental and analytical protocols; establishing safety procedures; system "shake-down"; training students; system calibration.
Task 2. Economic and energy analysis.
Task 3. Catalysts formulation, synthesis and optimization.
Task 4. Catalyst characterization studies.
Task 5. Activity tests, kinetic studies, deactivation and regeneration studies.
Task 6. Information dissemination.
Task 7. Literature awareness; data analysis; reproducibility tests.

2. Does any part of your project require review and/or permitting by any other federal, state, regional, local, environmental, or regulatory agency? ☐ Yes ☑ No

3. Has any review (e.g., NEPA documentation, permits, agency consultations) been completed?
☐ Yes ☑ No If yes, is a finding or report available and how can a copy be obtained?

4. Is the proposed project part of a larger scope of work? ☐ Yes ☑ No If yes, please describe.

Do you anticipate requesting additional federal funding for subsequent phases of this project?
☐ Yes ☑ No If yes, please describe.

5. Does the scope of your project **only** involve one or more of the following:
- ☐ Information gathering such as literature surveys, inventories, audits,
- ☐ Data analysis including computer modeling,
- ☐ Document preparation such as design, feasibility studies, analytical energy supply and demand studies, or
- ☐ Information dissemination, including document mailings, publication, distribution, training, conferences, and informational programs.

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PART II: Environmental Considerations

Section A Conditions or special areas are present, required, or could be affected by your project:

1. Clearing or Excavation

No impact - All work performed will be completed in existing laboratory facilities and therefore does not have the potential to affect any environmental conditions in Section A of this Environmental Checklist.

Section B. Would your project use, disturb, or produce any chemicals or biological substances? (i.e., pesticides, industrial process, fuels, lubricants, bacteria)

2. Import, Manufacture, or Processing of Toxic Substances

☐ Permit Required Quantity: Lab scale Permit Type:

Specific nature of use:

All work performed in the project is on the laboratory scale as defined in section 29 of the Code of Federal regulations (29 CFR) PART 1910 – Occupational Safety and Health Standards. The work to be conducted is of the research nature and not intended to be part of a production or manufacture process.

A detailed Process Hazard Analysis (PHA) has been performed and included in the original proposal of the project. Summary providing specifics to the "yes" answers on Item No. 2, 3, 5, 6, and 8 will be addressed here:

The catalytic reaction of research interest in the project will be conducted at the laboratory scale and will react ethanol, water and diluent (nitrogen) over a solid catalyst to produce a gaseous stream of hydrogen, carbon monoxide, carbon dioxide. Other products, and un-reacted ethanol/water, will be condensed out of the reactant stream and collected as non-flammable laboratory waste. The trace by-products of the reaction present in this stream are expected to be Chemical A, Chemical B, and Chemical C. Additionally, the typical carbon monoxide concentration in the system is expected to be below 1vol% and hazard associated with carbon monoxide have been addressed in the PHA for the scope of the project.

3. Chemical Storage, Use, and Disposal

☐ Permit Required Quantity: Lab scale Permit Type:

Specific nature of use:

Specific procedures for collecting and disposing of waste will be included in the operator checklists and are present in the PHA. In general, transferring of hazardous waste material will occur only in a properly ventilated area. All waste will be kept in an approved container in a satellite accumulation area congruent to the existing Chemical Hygiene Plan (CHP) of the research group and the Department of Chemical and Biomolecular Engineering. The waste containers will be kept in the satellite accumulation area until pickup by the Environmental Health and Safety personal at XYZ State University.

5. Hazardous, Toxic, or Criteria Pollutant Air Emissions

☐ Permit Required Quantity: Lab scale Permit Type:

Specific nature of use:

The gaseous product of the reaction studies in this project will be analyzed for composition and expelled through laboratory fume hoods. The small scale of the experiments to be performed will keep the concentrations of gaseous products below any emission standard. However, hazard associated with hydrogen, carbon monoxide, and alcohol/hydrocarbon vapors have been addressed in the PHA of the project. Specifically, administrative procedures, engineering controls (fume hoods, process alarms), and a chemical hygiene plan addressing work with flammables and toxic gases, personal protection equipment are in place to mitigate any risks encountered during the course of the project.

6. Liquid Effluent

☐ Permit Required Quantity: Lab scale Permit Type:

Specific nature of use:

Any liquid effluent generated from the project will be in the form of condensate liquid containing greater than 50% water. Other materials will include Chemical A, Chemical B, Chemical C. This condensate will be analyzed for composition and treted as laboratory waste as addressed in Item #s 3 and 8.

8. Hazardous Waste

☐ Permit Required Quantity: Lab scale Permit Type:

Specific nature of use:

Additional laboratory wastes will be generated in the preparation of solid catalysts. These wastes will be collected, stored, and disposed of in a manner congruent to the existing Chemical Hygiene Plan (CHP) of the research group and the Department of Chemical and Biomolecular Engineering. Also, see item #3.

Section C. Would your project require or produce any radiological materials?

1. Radioactive Mixed Waste

☐ Permit Required Quantity:None Permit Type:

Specific nature of use:

No radiological materials will be used or produced in the course of this project.